What is claimed is:

1.   A method for calibration of a transformation of at least two X-ray attenuation values determined using different X-ray spectra for a material to a value for the density and a value for the atomic number of the material, the method comprising:

recording a first distribution of first X-ray attenuation values obtained from a calibration phantom using a first X-ray spectrum, and a second distribution of second X-ray attenuation values obtained from the calibration phantom using a second X-ray spectrum, wherein the calibration phantom includes at least three calibration samples arranged physically separately from one another and including at least one of different densities and atomic numbers;

calculating a density function which associates a value for a density of the material with a combination of a first recorded X-ray attenuation value for a material with a second recorded X-ray attenuation value for the material; and

calculating an atomic number function, associating a value for an atomic number of the material with a combination of the first recorded X-ray attenuation value for the material with the second recorded X-ray attenuation value for the material; and

determining a value for the density and for the atomic number of the calibration sample with the aid of the density function and the atomic number function from the first and second X-ray

attenuation values recorded for a calibration sample;

determining a discrepancy between the determined values and the actual density and atomic number of the calibration sample; and

using the discrepancy as the basis to produce a mapping rule which changes the values determined by the density function and the atomic number function to the actual values.

2. The method as claimed in claim 1, wherein calibration samples are used whose values for the density and atomic number cover the area of interest for an X-ray examination.

3. The method as claimed in claim 1, wherein a greater number of calibration samples are used in the density and atomic number areas of interest.

4. The method as claimed in claim 1, wherein the mapping rule is stored in a data processing system.

5. A computer program product for calibration of a transformation of at least two X-ray attenuation values, determined using different X-ray spectra, for a material, the computer program product, when run on a computer, causing the computer to perform the following steps:

producing a density function and an atomic number function from the X-ray attenuation values recorded from a calibration phantom at at least two different X-ray spectra using at least three calibration samples arranged physically separately

from one another and including at least one of different densities and different atomic numbers;

calculating values for the density and atomic number of a calibration sample with the aid of the density function and of the atomic number function from the first and second X-ray attenuation values recorded for the calibration sample;

calculating a discrepancy between the values for the density and atomic number calculated for the calibration sample and the actual density and atomic number of the calibration sample; and

producing a mapping rule which changes the values determined by the density function and the atomic number function to the actual values based on the discrepancy determined.

6. The method as claimed in claim 2, wherein a greater number of calibration samples are used in the density and atomic number areas of interest.

7. The method as claimed in claim 2, wherein the mapping rule is stored in a data processing system.

8. The method as claimed in claim 3, wherein the mapping rule is stored in a data processing system.

9. The method as claimed in claim 6, wherein the mapping rule is stored in a data processing system.

10. A computer program, adapted to cause a computer device to perform the method of claim 1.

11.   A computer readable medium comprising the computer program of claim 10.

12.   A computer data signal comprising the computer program of claim 10.